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**DL8234**

# ANALOG ALARM CLOCK WITH SNOOZE

*Chips or wafers*

## GENERAL DESCRIPTION

The DL8234  series are CMOS analog alarm Clock circuits which drive a stepping motor precisely if a 32768 Hz quartz crystal is properly connected. It provides a alarm function and are equipped with a snooze function that restarts the alarm signal after 256 seconds.

## FEATURES

- Single 1,5 volt battery operation
- Low current consumption
- 32,768 Hz +20 ppm quartz crystal controlled oscillator
- 1 Hz stepping motor driven with 31.25 ms pulse width
- Active low alarm enable input (ALI)
- Snooze is a low trigger
- 256-second snooze interval
- Variable tone (4 steps) alarm output

## ABSOLUTE MAXIMUM RATING    (Ta=25°C)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Supply voltage | $V_{DD} - V_{SS}$ | -0,3 ÷ +5,0 | V |
| Input voltage range | Vin | $V_{SS} < Vin < V_{DD}$ | V |
| Operating temperature | Topr | -10 ~ +70 | °C |
| Storage | Tstg | -55 ~ +150 | °C |

## !!! Note:

In using the  DL8234   ICs version with the +20 (+10 to + 30) ppm quartz resonator the oscillator frequency will be 32772 ± 0,3 Hz, which should correspond to the accuracy of + 9.5 to + 11.5 s/day. However, the built-in digital frequency divider will reduce the internal chip clock rate by 4 Hz (up to 32768 Hz), in which case the clock will have an acceptable accuracy, i.e. + (9.5 ÷ 11.5) – 10,5 = ± 1,0 s/day.

# ELECTRICAL CHARACTERISTICS

(V$_{DD}$ = 1,5 V, TA = 25°C, Fosc = 32768 Hz, X tails = 25 KΩ

| Item | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|------|--------|------------|------|------|------|------|
| Operating voltage | Vop | | 1,2 | 1,5 | 1,8 | V |
| Operating current | Iop | No load | | 1 | 2 | µA |
| Saturation Resistance Mot1 - Mot2 | R$_{SR}$ | V$_{DD}$ = 1,2v R$_L$ = 200Ω | | 50 | 70 | Ω |
| Alarm output Sick Current | I$_{ALOS}$ | V$_{DD}$ = 1,2v Vao = 0,6v | 10 | 15 | | mA |
| Alarm output Drive Current | I$_{ALOD}$ | V$_{DD}$ = 1,2v Vao = 0,6v | 350 | 500 | 700 | µA |
| Alarm input activation current | I$_{ALIA}$ | | 1 | | 8 | µA |
| Alarm frequency (SPEAKER) | F$_{AS}$ | | | 2048 | | Hz |
| Stability Δf/f | | ΔV$_{DD}$ =0,1v | | | ±0,2 | ppm |
| Built-in OSCO Capacitance | C$_{OSCO}$ | | | 20 | | pF |
| Built-in OSCI Capacitance | | | | 20 | | pF |
| Oscillator start | t$_{st}$ | V$_{DD}$ =1,2v | | | 2 | S |

## PAD FANCTION

attention: the substrate of chip is connected to Vss

| Pad name | Function Description |
|----------|---------------------|
| ALO | Alarm signal output |
| V$_{DD}$ | Positive power supply |
| OSCI | Crystal controlled oscillator input |
| OSCO | Crystal controlled oscillator output |
| Vss | Negative power supply |
| SN | Snooze trigger input |
| ALI | Alarm enable input |
| MOT2, MOT1 | Motor driving output |

# TIMING WAVEFORMS

Motor    Output    Driving

$\Delta T=31.25\text{ms}$

MOT1

2s

MOT2

1s

Alarm output

ALI

SNOOZE

256    256

ALO
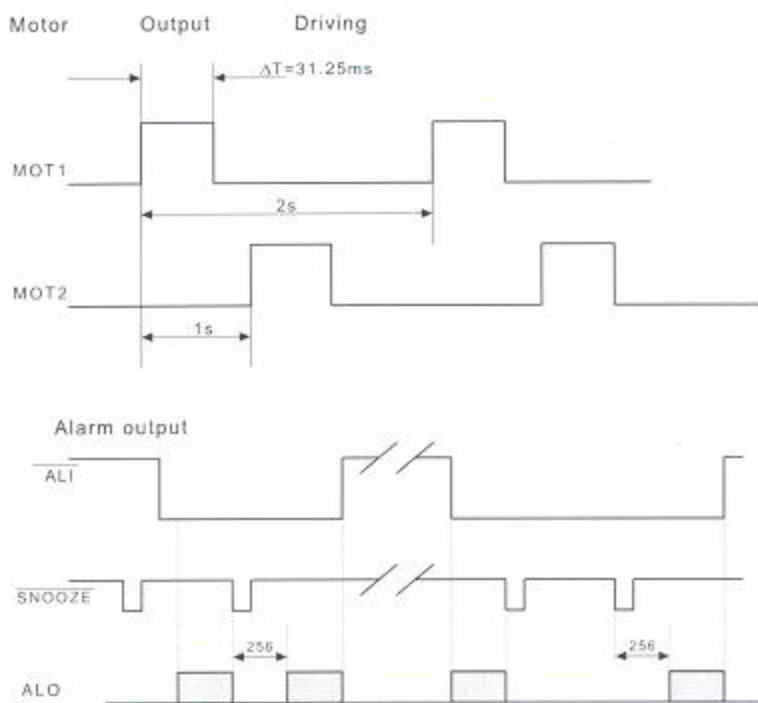
# ALARM WAVEFORMS

| Time (sec) after Alarm goes on | Alarm Waveform | Duly (%) of fundamental wave |
|---|---|---|
| 0-8 | 500 ms  500 ms | 12,5 |
| 9-16 | 500 ms  500 ms | 25 |
| 17-24 | 500 ms  500 ms | 50 |
| ≥25 | | 50 |

## APPLICATION CIRCUIT



OSC1

NC

OSC0

$V_{DD}$

$V_{SS}$

SN

AL0

AL1

MOT1

MOT2

M

+

−
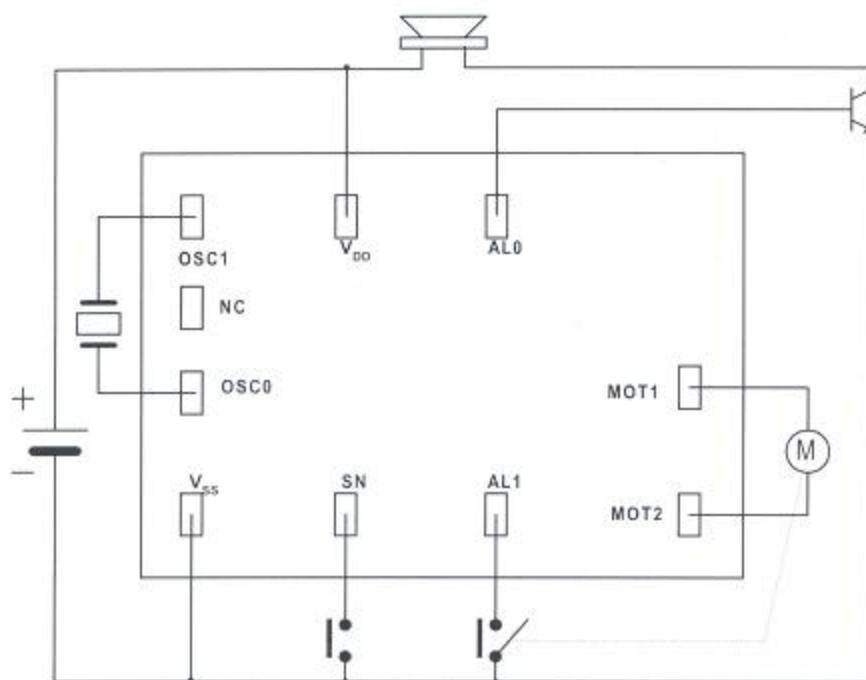
## PAD DIAGRAM
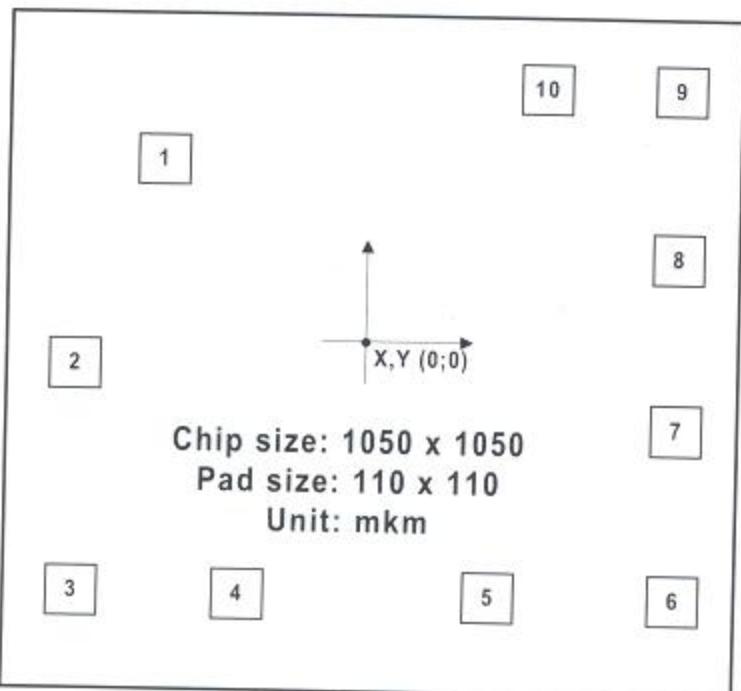


4 - NO BONDING

## PAD LOCATION

| Pad number | Pad name | X | Y | Pad number | Pad name | X | Y |
|---|---|---|---|---|---|---|---|
| 1 | ALO | -325 | 130 | 6 | $V_{SS}$ | 375 | -375 |
| 2 | $V_{DD}$ | -375 | -35 | 7 | SN | 375 | -45 |
| 3 | OSCI | -375 | -375 | 8 | ALI | 375 | 115 |
| 4 | NC | -80 | -385 | 9 | MOT2 | 375 | 375 |
| 5 | OSCO | 215 | -375 | 10 | MOT1 | 175 | 375 |